

WHAT IS CLAIMED IS:

1. A method of dewatering a fibrous web in a paper machine, comprising the steps of:
carrying the fibrous web on a side of a first fabric;
contacting the fibrous web with a side of a second fabric, the fibrous web being between
said first fabric and said second fabric; and
5 passing air successively through said first fabric, the fibrous web and said second fabric.
2. The method of claim 1, wherein said first fabric is a structured fabric and said second
fabric is a dewatering fabric.
3. The method of claim 2, wherein said structured fabric includes a plurality of valleys
and a plurality of peaks.
4. The method of claim 2, wherein said dewatering fabric includes:
a woven permeable fabric;
a polymeric layer having openings therethrough, said polymeric layer connected to said
permeable fabric; and
at least one batt layer needled to said permeable fabric and said polymeric layer, thereby
connecting said permeable fabric and said polymeric layer.
5. The method of claim 4, wherein said dewatering fabric further comprises at least one
anti-rewet layer attached to at least one of said permeable fabric and said at least one batt fiber.
6. The method of claim 5, wherein said anti-rewet layer is an elastomeric membrane.

7. The method of claim 6, wherein said elastomeric membrane is less than approximately 1.05 mm thick.

8. The method of claim 4, wherein said dewatering fabric further comprises an anti-rewet layer having a first side and a second side, said first side attached to said permeable fabric, said at least one batt fiber layer includes an other batt fiber layer connected to said second side.

9. The method of claim 8, wherein said anti-rewet layer includes pores therethrough.

10. The method of claim 9, wherein said pores have a mean pore diameter in the range of approximately 5 microns to approximately 75 microns.

11. The method of claim 1, wherein said passing step is accomplished by at least one of the steps of:

placing a negative air pressure on an other side of said second fabric; and

placing a positive air pressure on an other side of said first fabric.

12. The method of claim 11, wherein only said placing a negative air pressure step is executed.

13. The method of claim 12, wherein said placing a negative air pressure step is applied by a vacuum roll.

14. The method of claim 13, further comprising the step of applying a vacuum of between approximately -0.2 bar to approximately -0.8 bar by way of said vacuum roll.

15. The method of claim 13, further comprising the step of applying a vacuum of at least -0.4 bar.

16. The method of claim 1, further comprising the step of contacting an other side of said first fabric with an extended nip press belt.

17. The method of claim 16, wherein said passing air step additionally includes first passing air through said extended nip press belt.

18. The method of claim 1, further comprising the step of conveying said first fabric with the fibrous web to at least one of a Yankee roll, a suction roll, a hot air hood, a boost dryer, an air press, an HPTAD and a two pass HPTAD.

19. The method of claim 18, wherein said conveying step is conveying said first fabric with the fibrous web to said Yankee roll.

20. A paper machine dewatering system, comprising:
a first fabric carrying a fibrous web on a side thereof;
a second fabric in at least partial contact with said fibrous web, said fibrous web being between said first fabric and said second fabric; and

5 an airflow device moving air successively through said first fabric, said fibrous web and said second fabric.

21. The system of claim 20, wherein said first fabric is a structured fabric and said second fabric is a dewatering fabric.

22. The system of claim 21, wherein said dewatering fabric includes:
a woven permeable fabric; and
a polymer layer having openings therethrough, said polymer layer connected to said permeable fabric.

23. The system of claim 22, wherein said dewatering fabric further includes at least one batt layer needled to said permeable fabric and said polymer layer, thereby connecting said permeable fabric and said polymer layer.

24. The system of claim 23, wherein said at least one batt layer includes a first batt layer and a second batt layer, said first batt layer adjacent said permeable fabric, said second batt layer adjacent said polymer layer, said first batt layer and said second batt layer needled to said permeable fabric and said polymer layer.

25. The system of claim 24, wherein said polymer layer is a flexible polyurethane.

26. The system of claim 22, wherein said polymer layer is a grid of polymer material, said grid having a plurality of machine direction runs and a plurality of cross direction runs.

27. The system of claim 26, further comprising a plurality of yarns combined with said grid of polymer material, thereby forming a composite layer, at least one of said yarns internal to each of a corresponding one of said plurality of machine direction runs.

28. The system of claim 27, wherein said dewatering fabric further includes at least one batt layer needled to said permeable fabric and said composite layer, thereby connecting said permeable fabric and said composite layer.

29. The system of claim 22, wherein said polymer layer is connected to said permeable fabric by at least one of laminating, melting, re-melting and an adhesive.

30. The system of claim 22, wherein said polymer layer further includes a plurality of yarns within said polymer layer.

31. The system of claim 22, wherein said polymer layer is less than approximately 1.05 mm thick.

32. The system of claim 22, wherein said openings have a mean diameter in the range of approximately 5 microns to approximately 75 microns.

33. The system of claim 20, wherein said airflow device induces at least one of a vacuum on a side of said second fabric and a positive pressure on a side of said first fabric.

34. The system of claim 33, wherein only said vacuum is induced.

35. The system of claim 34, further comprising a vacuum roll, said vacuum being applied by way of said vacuum roll.

36. The system of claim 35, wherein said vacuum roll has an interior circumferential portion with a vacuum applied thereto, thereby defining a vacuum zone.

37. The system of claim 36, wherein said interior circumferential portion is in the range of approximately 200 mm to approximately 2,500 mm.

38. The system of claim 37, wherein said interior circumferential portion is in the range of approximately 300 mm to approximately 1,200 mm.

39. The press of claim 38, wherein said interior circumferential portion is in the range of approximately 400 mm to approximately 800 mm.

40. The system of claim 20, further comprising an extended nip press belt contacting an other side of said first fabric.

41. The system of claim 40, wherein said extended nip press belt includes at least one of a spiral link fabric and a flexible reinforced polyurethane.

42. The system of claim 40, wherein said airflow device additionally passes air through said extended nip press belt.

43. The system of claim 20, further comprising at least one additional dewatering component, each said additional dewatering component including one of a Yankee roll, a suction roll, a hot air hood, a boost dryer, an air press, an HPTAD and a two pass HPTAD, said fibrous web conveyed in a machine direction, each said additional dewatering component being
5 downstream in said machine direction from said airflow device.

44. The system of claim 43, wherein said Yankee roll is downstream in said machine direction, said Yankee roll receiving said fibrous web from said first fabric.

45. A method of manufacturing a fibrous web in a paper machine, comprising the steps of:

forming the fibrous web in contact with a side of a first fabric;
carrying the fibrous web on said side of said first fabric;
5 contacting the fibrous web with a side of a second fabric, the fibrous web being between said first fabric and said second fabric; and
passing air successively through said first fabric, the fibrous web and said second fabric.

46. The method of claim 45, wherein said first fabric is a structured fabric and said second fabric is a dewatering fabric.

47. The method of claim 46, wherein said structured fabric includes a plurality of valleys and a plurality of peaks.

48. The method of claim 46, wherein said dewatering fabric includes:

at least one batt fiber layer; and

a permeable fabric, said at least one batt fiber layer and said permeable fabric being needle punched with straight through drainage channels.

49. The method of claim 48, wherein said dewatering fabric further comprises at least one anti-rewet layer attached to at least one of said permeable fabric and said at least one batt fiber.

50. The method of claim 49, wherein said anti-rewet layer is an elastomeric membrane.

51. The method of claim 50, wherein said elastomeric membrane is less than approximately 1.05 mm thick.

52. The method of claim 51, wherein said dewatering fabric further comprises an anti-rewet layer having a first side and a second side, said first side attached to said permeable fabric, said at least one batt fiber layer includes an other batt fiber layer connected to said second side.

53. The method of claim 52, wherein said anti-rewet layer includes pores therethrough.

54. The method of claim 53, wherein said pores have a mean pore diameter in the range of approximately 5 microns to approximately 75 microns.

55. The method of claim 45, wherein said passing step is accomplished by at least one of the steps of:

placing a negative air pressure on an other side of said second fabric; and
placing a positive air pressure on an other side of said first fabric.

56. The method of claim 55, wherein only said placing a negative air pressure step is executed.

57. The method of claim 56, wherein said placing a negative air pressure step is applied by a vacuum roll.

58. The method of claim 57, further comprising the step of applying a vacuum of between approximately -0.2 bar to approximately -0.8 bar by way of said vacuum roll.

59. The method of claim 57, further comprising the step of applying a vacuum of at least -0.4 bar.

60. The method of claim 45, further comprising the step of contacting an other side of said first fabric with an extended nip press belt.

61. The method of claim 60, wherein said passing air step additionally includes first passing air through said extended nip press belt.

62. The method of claim 45, further comprising the step of conveying said first fabric with the fibrous web to at least one of a Yankee roll, a suction roll, a hot air hood, a boost dryer, a suction box, an air press, an HPTAD and a two pass HPTAD.

63. The method of claim 62, wherein said conveying step is conveying said first fabric with the fibrous web to said Yankee roll.